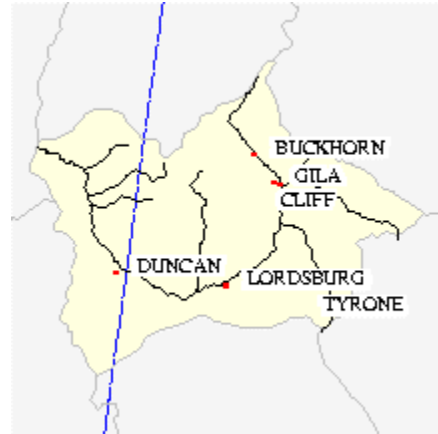


TOTAL MAXIMUM DAILY LOAD FOR TURBIDITY ON CANYON CREEK



Summary Table

New Mexico Standards Segment	Canyon Creek, 20.6.4.503 (formerly 2503)
Water body Identifier	Canyon Creek from the mouth on the Middle Fork of the Gila to the headwaters, 4.5 mi.
Parameters of Concern	Turbidity
Uses Affected	High quality coldwater fishery
Geographic Location	Gila River Basin (GRB1-30240)
Scope/size of Watershed	TMDL area: 44 mi ²
Land Type	Ecoregions: New Mexico/Arizona Mountains
Land Use/Cover	Rangeland (64%) and Forest (36 %)
Identified Sources	Natural, rangeland, road maintenance/runoff, removal of riparian vegetation, streambank destabilization
Watershed Ownership	Forest Service (99 %), Private (<1 %)
Priority Ranking	4
Threatened and Endangered Species	No
TMDL for: Turbidity (as TSS)	WLA + LA + MOS = TMDL 0 + 364.7 + 64.4 = 429.1 lbs/day

Table of Contents

List of Abbreviations	iv
Executive Summary	1
Background Information	2
Endpoint Identification	2
Target Loading Capacity	2
Figure 1. Upper Gila Watershed Land Use/Cover Map	3
Figure 2. Upper Gila Watershed Land Ownership Map	4
Flow	5
Calculations	5
Waste Load Allocations and Load Allocations	6
Waste Load Allocation (WLA)	6
Load Allocation (LA)	7
Identification and Description of Pollutant Sources	7
Linkage of Water Quality and Pollutant Sources	8
Margin of Safety (MOS)	9
Consideration of Seasonal Variation	10
Future Growth	10
Monitoring Plan	10
Implementation Plan	12
Management Measures	12
Introduction	12
Actions to be Taken	12
Other BMP Activities in the Watershed	16
Coordination	17
Timeline	17
Section 319(h) Funding Options	18
Assurances	18
Milestones	20
Public Participation	20

Table of Contents (Cont'd)

References Cited	21
Appendices	22
Appendix A: Conversion Factor Derivation for Canyon Creek	
Appendix B: Stream Geomorphology Information and Discharge Calculator for Canyon Creek	
Appendix C: Relationship Between Turbidity and Total Suspended Solids for Canyon Creek	
Appendix D: Data used for TMDL Field Measurement Calculations in Table 2 for Canyon Creek	
Appendix E: Pollutant Source(s) Documentation Protocol for Canyon Creek	
Appendix F: Public Participation Process Flowchart for Canyon Creek	
Appendix G: Response to Comments for Canyon Creek	

List of Abbreviations

BMP	Best Management Practice
BLM	United States Department of Interior Bureau of Land Management
CCCCG	Catron County Citizens Group
CFS	Cubic Feet per Second
CWA	Clean Water Act
CWAP	Clean Water Action Plan
CWF	Coldwater Fishery
EPA	United States Environmental Protection Agency
FS	United States Department of Agriculture Forest Service
GM	Gila Monster
GNF	Gila National Forest
HQCWF	High Quality Coldwater Fishery
ISI	Interstitial Space Index
LA	Load Allocation
MGD	Million Gallons per Day
mg/L	Milligrams per Liter
MOS	Margin of Safety
MOU	Memorandum of Understanding
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSGF	New Mexico State Game and Fish
NMSHD	New Mexico State Highway and Transportation Department
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NTU	Nephelometric Turbidity Units
SWQB	Surface Water Quality Bureau
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USGS	United States Geological Survey
UWA	Unified Watershed Assessment
WLA	Waste Load Allocation
WPS	Watershed Protection Section
WRAS	Watershed Restoration Action Strategy
WQLS	Water Quality Limited Segment
WQCC	New Mexico Water Quality Control Commission
WQS	Water Quality Standards

EXECUTIVE SUMMARY

Section 303(d) of the Federal Clean Water Act requires states to develop Total Maximum Daily Load (TMDL) management plans for waterbodies determined to be water quality limited. A TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state's water quality standards. It also allocates that load capacity to known point sources and nonpoint sources at a given flow. TMDLs are defined in 40 CFR Part 130 as the sum of the individual Waste Load Allocations (WLA) for point sources and Load Allocations (LA) for nonpoint sources, including a margin of safety (MOS), and natural background conditions.

Two stations were located on the creek to evaluate the impact of the watershed and to establish background conditions. Canyon Creek has been listed as impaired for unknown and plant nutrients since 1998. Monitoring demonstrated several exceedances of New Mexico water quality standards for turbidity on the perennial portion of Canyon Creek. Data to support this is included in Appendix D. Exceedances occurred in varying degrees during both high and moderate flow regimes. Both high and moderate flow data were used to calculate the measured loads in this TMDL document. No low flow data was available for this reach. Turbidity levels in New Mexico increase with higher flows. As a result of monitoring efforts in 2001, NMED believes the unknown listing to be turbidity impairment. This TMDL document addresses turbidity for Canyon Creek.

The Canyon Creek watershed is a sub-basin of the Gila River Basin, located in southwestern New Mexico. This creek is in standards segment 20.6.4.503 NMAC (formerly 2503) of the Gila River Basin. Segment 20.6.4.503 includes the mainstem of the Gila River from Gila Hot Springs upstream to the headwaters and all perennial tributaries to the Gila River at or above the Town of Cliff. Designated uses include high quality coldwater fishery, irrigation, livestock watering, wildlife habitat, domestic water supply and secondary contact. Use not fully supporting due to turbidity is high quality coldwater fishery.

A general implementation plan for activities to be established in the watershed is referred to in this document. The Surface Water Quality Bureau (SWQB) Watershed Protection Section (WPS) will further develop the details of this plan. Implementation of recommendations in this document will be done with full participation of all interested and affected parties. During implementation, additional water quality data will be collected. As a result targets will be re-examined and potentially revised.



This document is considered to be an evaluation of the Aquatic Vegetation and Woody Riparian Vegetation at Canyon Creek. The document indicates that the targets used in this analysis are not realistic. If the targets are adopted, the load capacity will be adjusted accordingly. When water quality standards have been achieved, the reach will be removed from the TMDL list.

Background Information

The Canyon Creek watershed is approximately 44 mi² and is located in southwestern New Mexico. The Canyon Creek watershed is dominated by rangeland and forest (Figure 1). The watershed is almost entirely Forest Service managed lands, with very little privately held lands (Figure 2).

Surface water quality monitoring stations were used to characterize the water quality of the stream reaches. Stations were located to evaluate the



**Channel
Substrate
at the
Canyon
Creek
Sampling
Site
(Photo
Taken on
June 18,
2001)**

impact on the stream and to establish background conditions. The historic SWQB monitoring station is located on the non-perennial portion of Canyon Creek. A data collecting YSI[®] multiparameter analysis sonde was deployed from 5/8/2001 to 5/17/2001, and from 6/18/2001 to 6/23/2001 at a new monitoring station located on the perennial portion of Canyon Creek. The sondes were programmed to read every 30-60 minutes. Sonde readings from this monitoring effort documented several exceedances of the New Mexico water quality standards for turbidity.

Endpoint Identification

Target Loading Capacity

Overall, the target values for both turbidity TMDLs will be determined based on 1) the presence of numeric criteria, 2) the degree of experience in applying the indicator and 3) the ability to easily monitor and produce quantifiable and reproducible results. For this TMDL document target values for turbidity are based on numeric criteria. This TMDL is consistent with the State antidegradation policy.

Figure 1

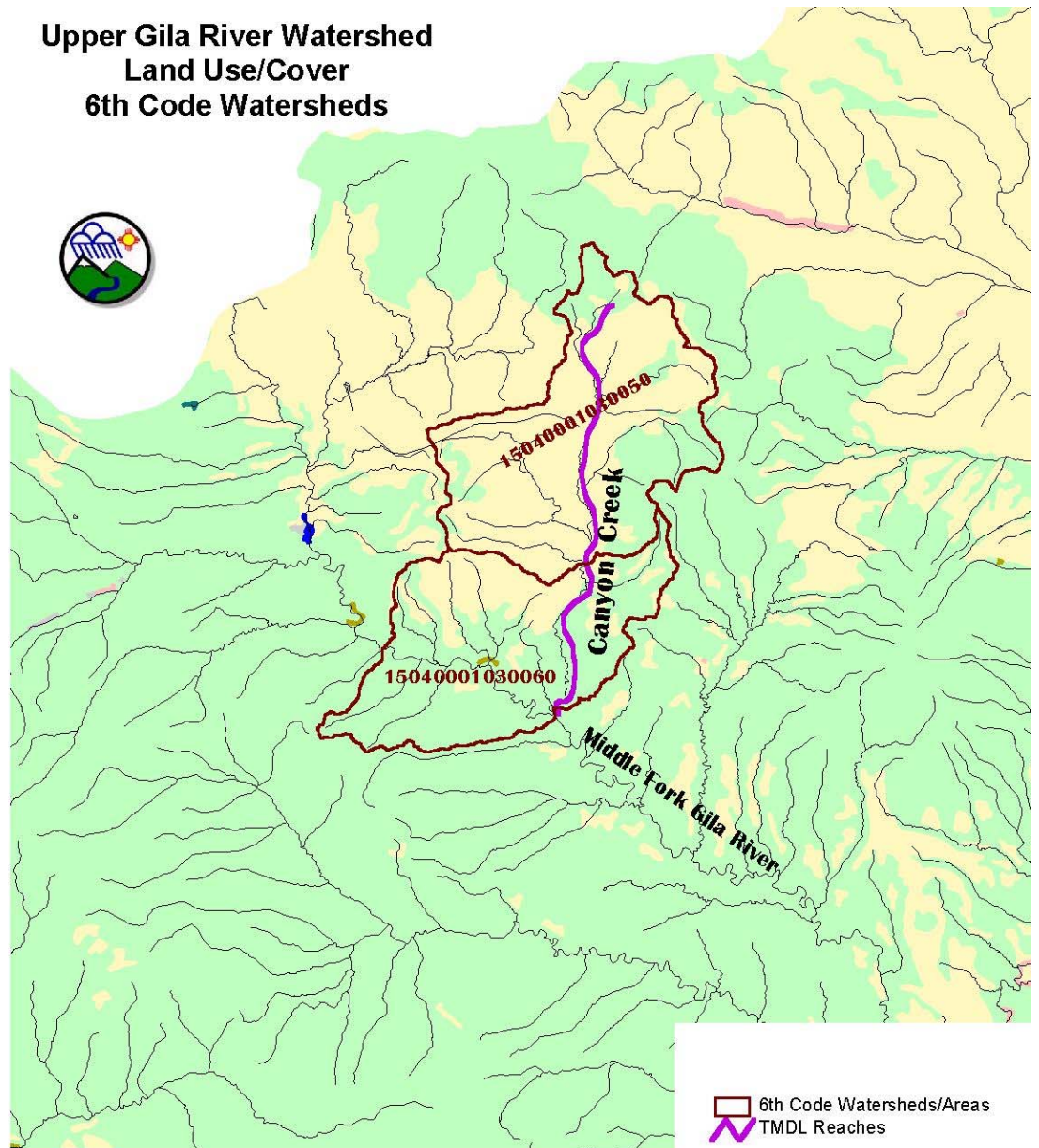
**Upper Gila River Watershed
Land Use/Cover
6th Code Watersheds**



HUC 5 NAME

**Middle Fork of the
Gila River**

<u>HUC</u>	<u>ACRES</u>	<u>MI²</u>
1030050	23,152	36.18
1030060	19,787	<u>30.92</u>



6th Code Watersheds/Areas
TMDL Reaches

Urban or Built-up
Agricultural
Rangeland
Forest Land
Water
Wetland
Barren

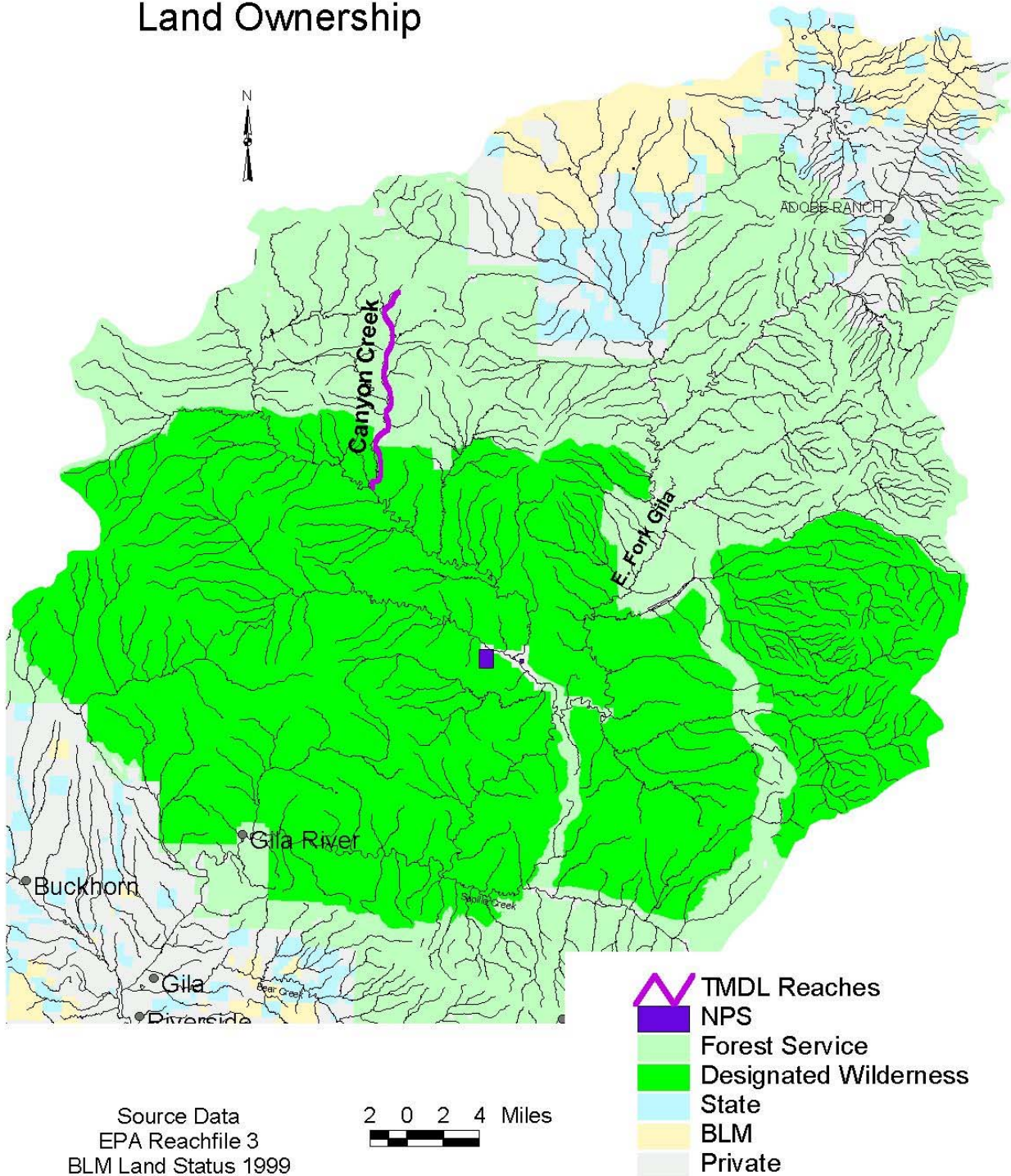
Source Data
EPA Reachfile 3
USGS Land Use/Cover
Clifton, AZ Quadrangle 1982



2 0 2 4 Miles

Figure 2

Upper Gila River Basin Land Ownership



Turbidity

According to New Mexico standards (20.6.4.12 NMAC):

Turbidity attributable to other than natural causes shall not reduce light transmission to the point that the normal growth, function, or reproduction of aquatic life is impaired or that will cause substantial visible contrast with the natural appearance of the water.

Canyon Creek is included in water quality standards segment 20.6.4.503 NMAC (formerly 2503), which includes:

The main stem of the Gila River from Gila hot springs upstream to the headwaters and all perennial tributaries to the Gila River at or above the town of Cliff.

The water quality standards specify that “turbidity shall not exceed 10 NTU” for any water contained in segment 20.6.4.503 NMAC.

Flow

Turbidity, or sediment, movement in a stream varies as a function of flow. As flow increases the concentration of sediment increases. TMDLs are calculated for each reach at a specific flow; in this case the target flow was high flow.

When available, USGS gages are used to estimate flow. Where gages are absent or poorly located along a reach, either actual flow (measured as water quality samples are taken) is used as target flows or geomorphologic sectional information is taken to model the flows. As there was no USGS gage station on Canyon Creek, the flow used for this TMDL was the bankfull discharge, using resources available at www.dnr.state.oh.us/odnr/soil+water/streammorphology.htm and cross-sectional information from Canyon Creek (see Appendix A). This TMDL is developed using a critical flow, in this case high flows. It was documented from the sonde data, that turbidity exceedances in Canyon Creek occurred in response to runoff or heavy precipitation (heavy precipitation was documented at the USFS Beaverhead weather station on May 14-16, 2001 (USFS 2001) with turbidity levels being elevated above 10 NTU May 9-18, 2001). It is important to remember that the TMDL is a planning tool to be used to achieve water quality standards. Since flows vary throughout the year in these systems at water quality standards the target load will vary based on the changing flow. Management of the load should set a goal of attainment, not meeting the calculated target load.

Calculations

A target load for turbidity is calculated based on a flow, the current water quality standards, and a unit-less conversion factor, 8.34 that is used to convert mg/L units to lbs/day (see Appendix B for Conversion Factor Derivation). The target loads (TMDLs) predicted to attain standards were calculated using Equation 1 and are shown in Table 1.

Equation 1. critical flow (mgd) x standard (mg/L) x 8.34 (conversion factor) = target loading capacity

Table 1: Calculation of Target Loads

Location	Flow ⁺ (mgd)	Standard* TSS (mg/L)	Conversion Factor	Target Load Capacity (lbs/day)
Canyon Creek	10.5	4.9	8.34	429.1

+Because there is no USGS station on this reach, the flow is the bankfull discharge (see Appendix B).

*This value is calculated using the relationship established between turbidity and TSS ($y=0.2271x+2.5855$) $R^2=0.8959$ (see Appendix C). The turbidity standard is 10 NTU so the corresponding TSS value is 4.9 mg/L. Although sufficient turbidity data were available from Canyon Creek (Appendix D) corresponding TSS data were not taken. Due to an insufficient paired TSS/turbidity data set specifically for Canyon Creek, a TSS/Turbidity relationship was established for Middle Fork Gilita (a reach with similar characteristics to Canyon Creek and also in the Gila Watershed). The relationship from Middle Fork Gilita will be used as a surrogate for Canyon Creek.

The currently measured loads were calculated using Equation 1. The flows used were taken from field measurements. The geometric mean of the data that exceeded the standards from the data collected at each site for TSS was substituted for the standard in Equation 1. The same conversion factor of 8.34 was used. Results are presented in Table 2.

Table 2: Calculation of Measured Loads

Location	Flow+ (mgd)	Field Measurements* (mg/L)	Conversion Factor	Measured Load (lbs/day)
Canyon Creek	10.5	7.9	8.34	691.8

+As there is no USGS station on this reach, the flow is the bankfull discharge (see Appendix A).

*This is the geometric mean of turbidity values (translated into TSS in mg/L using the established regression equation) that exceeded the numeric standard. (Data used to calculate field measurements are in Appendix D).

Background loads were not possible to calculate in this watershed. A reference reach, having similar stream channel morphology and flow, was not found. It is assumed that a portion of the load allocation is made up of natural background loads. In future water quality surveys, finding a suitable reference reach will be a priority.

Waste Load Allocations and Load Allocations

Waste Load Allocation

There are no point source contributions associated with this TMDL. The waste load allocation is zero.

Load Allocation

In order to calculate the load allocation (LA) the waste load allocation (WLA), and margin of safety (MOS) were subtracted from the target capacity (TMDL) following Equation 2.

$$\text{Equation 2. } WLA + LA + MOS = TMDL$$

Results are presented in Table 3 (Calculation of TMDLs for Turbidity).

Table 3: Calculation of TMDL for Turbidity

Location	WLA (lbs/day)	LA (lbs/day)	MOS (lbs/day)	TMDL (lbs/day)
Canyon Creek	0	364.7	64.4	429.1

The load reductions that would be necessary to meet the target loads were calculated to be the difference between the target load (Table 1) and the measured load (Table 2), and are shown in Table 4 (Calculation of Load Reductions). For example, for Canyon Creek, achieving the target load of 429.1 lbs/day would require a load reduction of 262.7 lbs/day. Achieving the target load for turbidity on Canyon Creek would require a load reduction of approximately 38%.

Table 4: Calculation of Load Reductions (in lbs/day)

Location	Target Load	Measured Load	Load Reduction
Canyon Creek	429.1	691.8	262.7

Identification and Description of Pollutant Source(s)

Table 5: Pollutant Source Summary

Pollutant Sources (% from each)	Magnitude (WLA + LA + MOS)	Location	Potential Sources
<u>Point</u> : None (0%)	0	-----	None
<u>Nonpoint</u> : (100%) •Turbidity (as TSS in lbs/day)	691.8	Canyon Creek	Natural, Rangeland, Road maintenance/runoff, Removal of Riparian Vegetation, Streambank Destabilization

Linkage of Water Quality and Pollutant Sources

Where available data are incomplete or where the level of uncertainty in the characterization of sources is large, the recommended approach to TMDLs requires the development of allocations based on estimates utilizing the best available information. Data that were collected and used for the calculation of the existing condition for Canyon Creek, with respect to turbidity and TSS, are included in Appendix D.

SWQB fieldwork includes an assessment of the potential sources of impairment (SWQB/NMED revised 10/2/00). The Pollutant Source(s) Documentation Protocol, shown as Appendix E, provides an approach for a visual analysis of a pollutant source along an impaired reach. Although this procedure is subjective, SWQB feels that it provides the best available information for the identification of potential sources of impairment in this watershed. Table 5 (Pollutant Source Summary) identifies and quantifies potential sources of nonpoint source impairments along each reach as determined by field reconnaissance and assessment. A further explanation of the sources follows.

Canyon Creek

The primary sources of impairment for this reach identified in the state 303(d) list are rangeland, removal of riparian vegetation, stream bank destabilization. Other sources of impairment along this reach are natural (seasonal flushing of sediment) and road maintenance/runoff. In 1974 and 1976 the Gila National Forest conducted several range studies on the Canyon Creek allotment. These studies concluded that the allotment was overstocked, and large land areas were degraded condition. Based upon the range study done in 1976, 2,485 acres (40%) of the allotment were in fair condition while the other 60% (3,825 acres) were in poor condition.

Livestock impact vegetation in two ways 1) by selective removal of palatable species during grazing and 2) by trampling and incidental damage of vegetation while foraging, moving or watering. Trampling is concentrated around water sources, salt grounds, and trails between forage and water areas. Cattle have access to Canyon Creek and were moving through the Creek during periods when turbidity exceeded standards in 2001.



**Canyon
Creek at
Hulse
Ranch
(Photo
taken on
May 8,
2001)**

Use of existing roads and trails, new construction, and reconstruction are potential significant sources of on-site soil loss and sedimentation to downstream areas. The physical act of driving or walking down a road or trail removes vegetation and compacts the soil. During wet muddy periods, much damage can occur. Ruts can form and drainage may become impacted. None of the roads or trails within this watershed have seasonal closures.



**Canyon Creek Looking Upstream (NW)
from FR 142
(Photo taken on May 8, 2001)**

Many roads and trails on the Forest do not have adequate drainage, do not receive adequate maintenance, and are not properly placed on the landscape. Implementation of BMPs such as installation of adequate drainage, revegetating the slopes, gravelling or paving the road/trail surface, and restricting use during wet periods can significantly reduce soil loss. Trails have a narrower width, but have problems similar to roads. There are

very few roads on the Canyon Creek allotment, however FR 142 accesses the private land in-holding, and headquarters of the allotment, which could contribute to some sediment loading in the stream.

Margin of Safety (MOS)

TMDLs should reflect a margin of safety based on the uncertainty or variability in the data, the point and nonpoint source load estimates, and the modeling analysis. For this TMDL, there will be no margin of safety for point sources, since there are none. However, for the nonpoint sources the margin of safety is estimated to be an addition of **15%** for Canyon Creek for turbidity to the TMDL, excluding the background. This margin of safety incorporates several factors:

- Errors in calculating NPS loads*

A level of uncertainty exists in sampling nonpoint sources of pollution. Accordingly, a conservative margin of safety for turbidity increases the TMDL by 10%.

- Errors in calculating flow*

Flow estimates were based on the estimation of the 4Q3 for ungaged streams and compared to actual flows and cross-sectional information taken in the field.

Techniques used for measuring the flow on Canyon Creek water have a (\pm) 5% precision. Accordingly, a conservative margin of safety increases the TMDL by 5%.

Consideration of Seasonal Variation

Data used in the calculation of this TMDL were collected during high and low flows in order to ensure coverage of any potential seasonal variation in the system. Critical condition is set to the highest flows for turbidity. Data where exceedances were documented (only during higher flows) were used in the calculation of the measured loads (Appendix D).

Future Growth

Future growth and growth estimates are of interest to Western New Mexico University (WNMU), who in cooperation with other groups and agencies, has produced documentation pertaining to Socio-Economic studies of the southwestern counties in an attempt to better understand trends. Estimations of future growth are not anticipated to lead to a significant increase for turbidity that cannot be controlled with best management practice implementation in this watershed. Canyon Creek runs through almost entirely Forest Service managed lands with very little privately held lands.

Monitoring Plan

Pursuant to Section 106(e)(1) of the Federal Clean Water Act, the SWQB has established appropriate monitoring methods, systems and procedures in order to compile and analyze data on the quality of the surface waters of New Mexico. In accordance with the New Mexico Water Quality Act, the SWQB has developed and implemented a comprehensive water quality monitoring strategy for the surface waters of the State. The monitoring strategy establishes the methods of identifying and prioritizing water quality data needs, specifies procedures for acquiring and managing water quality data, and describes how these data are used to progress toward three basic monitoring objectives: to develop water quality-based controls, to evaluate the effectiveness of such controls and to conduct water quality assessments.

The SWQB utilizes a rotating basin system approach to water quality monitoring. In this system, a select number of watersheds are intensively monitored each year with an established return frequency of every five to seven years.

The SWQB maintains current quality assurance and quality control plans to cover all monitoring activities. This document, "Quality Assurance Project Plan for Water Quality Management Programs" (QAPP) is updated annually (SWQB/NMED 2001). Current priorities for monitoring in the SWQB are driven by the 303(d) list of streams requiring TMDLs. Short-term efforts will be directed toward those waters which are on the EPA TMDL consent decree (Forest Guardians and Southwest Environmental Center v. Carol Browner, Administrator, US EPA, Civil Action 96-0826 LH/LFG, 1997) list and which are due within the first two years of the monitoring schedule. Once assessment monitoring is completed those reaches showing impacts and requiring a TMDL will be targeted for more intensive monitoring.

The methods of data acquisition include fixed-station monitoring, intensive surveys of priority water bodies, including biological assessments, and compliance monitoring of industrial, federal and municipal dischargers, and are specified in the SWQB Assessment Protocol (SWQB/NMED revised 10-2-00).

Long term monitoring for assessments will be accomplished through the establishment of sampling sites that are representative of the waterbody and which can be revisited every five to seven years. This gives an unbiased assessment of the waterbody and establishes a long term monitoring record for simple trend analyses. This information will provide time relevant information for use in 305(b) assessments and to support the need for developing TMDLs. The approach provides:

- a systematic, detailed review of water quality data, allowing for a more efficient use of valuable monitoring resources.
- information at a scale where implementation of corrective activities is feasible.
- an established order of rotation and predictable sampling in each basin which allows for enhanced coordinated efforts with other programs.
- program efficiency and improvements in the basis for management decisions.

It should be noted that a basin would not be ignored during its sampling hiatus. The rotating basin program will be supplemented with other data collection efforts. Data will be analyzed, field studies will be conducted, to further characterize acknowledged problems, and TMDLs will be developed and implemented. Both long term and field studies can contribute to the 305(b) report and 303(d) listing processes.

The following schedule is a draft for the sampling seasons through 2004 and will be followed in a consistent manner to support the New Mexico Unified Watershed Assessment (UWA) and the Nonpoint Source Management Program. This sampling regime allows characterization of seasonal variation and through sampling in spring, summer, and fall for each of the watersheds.

- 1998 Jemez Watershed, Upper Chama Watershed (above El Vado), Cimarron Watershed, Santa Fe River, San Francisco Watershed
- 1999 Lower Chama Watershed, Red River Watershed, Middle Rio Grande, Gila River Watershed (summer and fall), Santa Fe River
- 2000 Gila River Watershed (spring), Dry Cimarron Watershed, Upper Rio Grande 1 (Pilar north to the NM/CO border), Shumway Arroyo
- 2001 Upper Rio Grande 2 (Pilar south to Cochiti Reservoir), Upper Pecos Watershed (Ft Sumner north to the headwaters)
- 2002 Canadian River Watershed, San Juan River Watershed, Mimbres Watershed
- 2003 Lower Pecos Watershed (Ft. Sumner south to the NM/TX border including Ruidoso), Lower Rio Grande (southern border of Isleta Pueblo south to the NM/TX border)
- 2004 Rio Puerco Watershed, Closed Basins, Zuni Watershed

Implementation Plan

Management Measures

Management measures are “economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, citing criteria, operating methods, or other alternatives”(USEPA, 1993). A combination of best management practices (BMPs) will be used to implement this TMDL.

Introduction

Turbidity is a measurement of the reduction of the penetration of light through natural waters and is caused by the presence of suspended particles. Turbidity is a qualitative measure of water clarity or opacity and is reported in nephelometric turbidity units (NTU).

The turbidity standard addresses excessive sedimentation, which can lead to the formation of bottom deposits that can impact the aquatic ecosystem. Suspended solids such as clay, silt, ash, plankton, and organic materials generally cause turbidity. Some level of turbidity is a function of a stream’s natural process of moving water and sediment.

Examples of sources that can cause excessive turbidity include:

- Runoff from exposed soil (such as construction sites),
- Improperly maintained roads,
- Eroded streambanks,
- Activities that occur within a stream channel (such as some forms of mining),
- Removal of riparian vegetation, and
- In some cases, naturally occurring situations such as runoff from very heavy rain events.

Actions to be Taken

For this watershed the primary focus will be on the control of turbidity.

During the TMDL process in this watershed, point sources have been reviewed and will be addressed through the permit process. The nonpoint source contributions will need to address turbidity exceedances through BMP implementation.

There are a number of BMPs that can be utilized to address turbidity, depending on the source of the sediment. Such BMPs include:

1. Protection and/or development of healthy riparian buffer strips to serve as filters for soils that are transported during surface runoff. This runoff could be the result of activities in the watershed that disturbed soils or caused a loss of vegetative ground cover.
The riparian vegetation also helps to stabilize riverbanks with root structure, which prevents excessive bank erosion and helps maintain the stability and natural morphology of the stream

system. (Stream Corridor Restoration – Principles, Processes, and Practices, 1998, The Federal Interagency Stream Restoration Working Group);

2. Placement of silt fences between roads and watercourses to prevent soils that are disturbed during road and other construction activities from being carried into watercourses. Silt fences trap sediment that is carried during runoff events similar to a filter. When maintained properly, these silt fences are an effective erosion control measure that can be used throughout the State. (Erosion and Sediment Control Manual, 1993, Environment Department, Surface Water Quality Bureau);
3. Placement of straw mulch on soils that have lost cover from vegetative groundcover during severe forest fires. The straw mulch helps prevent erosion during rainstorms and snowmelt by holding the bare topsoil and ash in place. The mulch can also aid in the infiltration of water and replace ground litter. This method works well on gentle slopes where there is no wind. (Cerro Grande Fire Burned Area Emergency Rehabilitation (BAER) Plan, 2000, Interagency Baer Team.

Additional sources of information for possible BMPs to address turbidity are listed below. Some of these documents are available for viewing at the New Mexico Environment Department, Surface Water Quality Bureau, Watershed Protection Section Library, 1190 St Francis Drive, Santa Fe New Mexico.

Agriculture

- Internet websites:
<http://www.nm.nrcs.usda.gov/>
- Bureau of Land Management, 1990, Cows, Creeks, and Cooperation: Three Colorado Success Stories. Colorado State Office.
- Cotton, Scott E. and Ann Cotton, Wyoming CRM: Enhancing our Environment.
- Goodloe, Sid and Susan Alexander, Watershed Restoration through Integrated Resource Management on Public and Private Rangelands.
- Grazing in New Mexico and the Rio Puerco Valley Bibliography.
- USEPA and The Northwest Resource Information Center, Inc., 1990, Livestock Grazing on Western Riparian Areas.
- USEPA and The Northwest Resource Information Center, Inc., 1993, Managing Change: Livestock Grazing on Western Riparian Areas.

Forestry

- New Mexico Natural Resources Department, 1983, Water Quality Protection Guidelines for Forestry Operations in New Mexico.
- New Mexico Department of Natural Resources, 1980, New Mexico Forest Practice Guidelines. Forestry Division, Timber Management Section
- State of Alabama. 1993. Alabama's Best Management Practices for Forestry.

Riparian and Streambank Stabilization

- Colorado Department of Natural Resources, Streambank Protection Alternatives. State Soil Conservation Board.
- Meyer, Mary Elizabeth, 1989, A Low Cost Brush Deflection System for Bank Stabilization and Revegetation.
- Missouri Department of Conservation, Restoring Stream Banks With Willows, (pamphlet).
- New Mexico State University, Revegetating Southwest Riparian Areas, College of Agriculture and Home Economics, Cooperative Extension Service, (pamphlet).
- State of Pennsylvania, 1986, A Streambank Stabilization And Management Guide for Pennsylvania Landowners. Department of Environmental Resources, Division of Scenic Rivers.
- State of Tennessee, 1995, Riparian Restoration and Streamside Erosion Control Handbook. Nonpoint Source Water Pollution Management Program.

Roads

- Becker, Burton C. and Thomas Mills, 1972, Guidelines for Erosion and Sediment Control Planning and Implementation, Maryland Department of Water Resources, # R2-72-015.
- Bennett, Francis William, and Roy Donahue, 1975, Methods of Quickly Vegetating Soils of Low Productivity, Construction Activities, US EPA, Office of Water Planning and Standards Report # 440/9-75-006.
- Hopkins, Homer T. and others, Processes, Procedures, and Methods to control Pollution Resulting from all Construction Activity,.US EPA Office of Air and Water Programs, EPA Report 430/9-73-007.

- New Mexico Natural Resources Department, 1983, Reducing Erosion from Unpaved Rural Roads in New Mexico, A Guide to Road construction and Maintenance Practices. Soil and Water Conservation Division
- New Mexico State Highway and Transportation Department and USDA-Soil Conservation Service, Roadside Vegetation Management Handbook.
- New Mexico Environment Department, 1993, Erosion and Sediment Control Manual. Surface Water Quality Bureau.
- USDA Forest Service Southwestern Region, 1996, Managing Roads for Wet Meadow Ecosystem Recovery. FHWA-FLP-96-016.

Section V. New Construction and Reconstruction

Section VI. Remedial Treatments

Section VII. Maintenance

- USEPA, 1992, Rural Roads: Pollution Prevention and Control Measures (handout).

Storm Water

- Delaware Department of Natural Resources and Environmental Control, 1997, Conservation Design for Stormwater Management: A Design Approach to Reduce Stormwater Impacts From Land Development and Achieve Multiple Objectives Related to Land Use. Sediment and Stormwater Program and The Environment Management Center, Brandywine Conservancy.
- State of Kentucky, 1994, Kentucky Best Management Practices for Construction Activity. Division of Conservation and Division of Water.
- USEPA, 1992, Storm Water Management for Construction Activities – Developing Pollution Prevention Plans and Best Management Practices, Summary Guidance, EPA 833-R-92-001, pgs. 7- 9.

Miscellaneous

- Interagency Baer Team, 2000, Cerro Grande Fire Burned Area Emergency Rehabilitation (BAER) Plan, Section F. Specifications.
- New Mexico Environment Department, 2000, A Guide to Successful Watershed Health. Surface Water Quality Bureau.
- Roley, William Jr., Watershed Management and Sediment Control for Ecological Restoration.

- Rosgen, David, 1996, Applied River Morphology, Chapter 8. Applications (Grazing, Fish Habitat).
- Rosgen, David, 1997, A Geomorphological Approach to Restoration of Incised Rivers.
- The Federal Interagency Stream Restoration Working Group, 1998, Stream Corridor Restoration. Principles, Processes, and Practices.

Chapter 8 – Restoration Design

Chapter 9 – Restoration implementation, Monitoring, and Management

- USDA Forest Service Southwestern Region, Soil and Water Conservation Practices Handbook.

Section 22, Range Management

Section 23, Recreation Management

Section 24, Timber Management

Section 25, Watershed Management

Section 26, Wildlife and Fisheries Management

Section 41, Access and Transportation Systems and Facilities

- Unknown, Selecting BMPs and other Pollution Control Measures.
- Unknown, Environmental Management. Best Management Practices.

Construction Sites

Developed Areas

Sand and Gravel Pits

Farms, Golf Courses, and Lawns

Other BMP Activities in the Watershed

The following are activities in this watershed that have occurred, are occurring, or are in the planning stages to address turbidity sources or other nonpoint source issues in the Canyon Creek watershed.

The Gila National Forest has taken an active role in the management of activities in the Canyon Creek Watershed. Concerning the Canyon Creek grazing allotment, the Gila National Forest produced an Environmental Assessment to authorize grazing of livestock on the allotment for a 10 year period, as well as a Cumulative Watershed Effects analysis. The result of these analyses was restricted grazing in the Canyon Creek allotment. As of 1998, livestock grazing in the watershed has been restricted from 70 cattle and 8 horses to 20 cattle and 4 horses. This will significantly decrease the impact from grazing to the watershed.

With this action, the vegetative ground cover should increase, soil compaction should be reduced due to fewer numbers of cattle and horses, infiltration should increase, and runoff should decrease. This will result in less soil loss and sedimentation to downstream areas. Riparian condition in Canyon Creek should improve if cattle are kept out of the area.

Coordination

In this watershed public awareness and involvement will be crucial to the successful implementation of this plan and improved water quality.

Staff from the SWQB is available to work with stakeholders to provide the guidance in developing the Watershed Restoration Action Strategy (WRAS). The WRAS is a written plan intended to provide a long-range vision for various activities and management of resources in a watershed. It includes opportunities for private landowners and public agencies to reduce and prevent impacts to water quality. This long-range strategy will become instrumental in coordinating and achieving a reduction of turbidity and will be used to prevent water quality impacts in the watershed. SWQB staff is available to provide any technical assistance such as selection and application of BMPs needed to meet WRAS goals.

The SWQB cooperates with stakeholders in this watershed and encourages the implementation of BMPs. Certain reaches in the Canyon Creek watershed may be suitable habitat for beaver that face extirpation in other locations. Beaver activities can bring about a rapid growth of riparian vegetation, change an ephemeral stream into a perennial stream, capture sediment, raise the water table, and reduce flood velocities. SWQB encourages efficient management of livestock and wildlife. Lastly, the SWQB will encourage all landowners in the watershed to consider road issues that may cause impairment of the streams ability to function.

Stakeholders in this process will include SWQB, the Gila Monster (GM) group, Gila National Forest (GNF), the Gila Permittees Association, Grant soil and Water Conservation District, and private landowners. Stakeholder public outreach and involvement in the implementation of this TMDL will be ongoing.

Timeline

The New Mexico Nonpoint Source Management Program December 1999, published by the New Mexico Environment Department, describes the dynamics of our attempts to reduce nonpoint source pollution. The following is an anticipated timeline for TMDL implementation in this watershed.

Implementation Action	Year 1	Year 2	Year 3	Year 4	Year 5
Public Outreach and Involvement	X	X	X	X	X
Establish Milestones	X				
Secure Funding	X		X		
Implement Management Measures (BMPs)		X	X		
Monitor BMPs		X	X	X	
Determine BMP Effectiveness				X	X
Re-evaluate Milestones				X	X

Section 319(h) Funding Options

The Watershed Protection Section of the SWQB provides USEPA 319(h) funding to assist in implementation of BMPs to address water quality problems on reaches listed on the 303(d) list or which are located within Category I Watersheds as identified under the Unified Watershed Assessment of the Clean Water Action Plan. These monies are available to all private, for profit, and nonprofit organizations that are authenticated legal entities, or governmental jurisdictions including: cities, counties, tribal entities, Federal agencies, or agencies of the State. Proposals are submitted by applicants through a request for proposals (RFP) process and require a non-federal match of 40% of the total project cost consisting of funds and/or in-kind services. Further information on funding from the Clean Water Act, Section 319(h) can be found at the New Mexico Environment Department website: <http://www.nmenv.state.nm.us>.

Assurances

New Mexico's Water Quality Act (Act) does authorize the Water Quality Control Commission to "promulgate and publish regulations to prevent or abate water pollution in the state" and to require permits. The Act authorizes a constituent agency to take enforcement action against any person who violates a water quality standard. Several statutory provisions on nuisance law could also be applied to nonpoint source water pollution. The Water Quality Act (NMWQCC 1995a) also states in §74-6-12(a):

The Water Quality Act (this article) does not grant to the commission or to any other entity the power to take away or modify the property rights in water, nor is it the intention of the Water Quality Act to take away or modify such rights.

In addition, the State of New Mexico Surface Water Quality Standards (Sections 20.6.4.6.C and 20.6.4.10.C NMAC) states:

These water quality standards do not grant the Commission or any other entity the power to create, take away or modify property rights in water.

New Mexico policies are in accordance with the federal Clean Water Act §101(g):

It is the policy of Congress that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired by this Act. It is the further policy of Congress that nothing in this Act shall be construed to supersede or abrogate rights to quantities of water, which have been established by any State.

Federal agencies shall co-operate with State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate pollution in concert with programs for managing water resources.

New Mexico's Clean Water Action Plan has been developed in a coordinated manner with the State's 303(d) process.

All Category I watersheds identified in New Mexico's Unified Watershed Assessment process are totally coincident with the impaired waters lists for 1996 and 1998 as approved by EPA. The State has given a high priority for funding, assessment, and restoration activities to these watersheds.

The description of legal authorities for regulatory controls/management measures in New Mexico's Water Quality Act does not contain enforceable prohibitions directly applicable to nonpoint sources of pollution. The Act does authorize the Water Quality Control Commission to "promulgate and publish regulations to prevent or abate water pollution in the state" and to require permits. Several statutory provisions on nuisance law could also be applied to nonpoint source water pollution.

NMED nonpoint source water quality management utilizes a voluntary approach. The state provides technical support and grant monies for implementation of BMPs and other NPS prevention mechanisms through section 319 of the Clean Water Act. Since portions of this TMDL will be implemented through NPS control mechanisms, the New Mexico Nonpoint Source Program will target efforts to this and other watersheds with TMDLs. The Nonpoint Source Program coordinates with the Nonpoint Source Taskforce. The Nonpoint Source Taskforce is the New Mexico statewide focus group representing federal and state agencies, local governments, tribes and pueblos, soil and water conservation districts, environmental organizations, industry, and the public. This group meets on a quarterly basis to provide input on the section 319 program process, to disseminate information to other stakeholders and the public regarding nonpoint source issues, to identify complementary programs and sources of funding, and to help review and rank section 319 proposals.

Milestones

Milestones will be used to determine if control actions are being implemented and standards attained. For this TMDL, several milestones will be established which will vary and will be determined by the BMPs implemented. Examples of milestones for turbidity include a decrease in measured turbidity values, a decrease in erosion from streambanks, or an increase in the miles of properly maintained roads.

Milestones will be coordinated by SWQB staff and will be re-evaluated periodically, depending on which BMPs were implemented. Further implementation of this TMDL will be revised based on this reevaluation. As additional information becomes available during the implementation of the TMDL, the targets, load capacity, and allocations may need to be changed. In the event that new data or information shows that changes are warranted, TMDL revisions will be made with assistance of watershed stakeholders. The re-examination process will involve: monitoring pollutant loading, tracking implementation and effectiveness of controls, assessing water quality trends in the waterbody, and re-evaluating the TMDL for attainment of water quality standards. Although specific targets and allocations are identified in the TMDL, the ultimate success of the TMDL is not whether these targets and allocations are met, but whether beneficial uses and water quality standards are achieved.

Public Participation

Public participation was solicited in development of these TMDLs. See Appendix F for flow chart of the public participation process. The draft TMDLs were made available for a 30-day comment period starting **October 9, 2001**. Response to comments is attached as Appendix G of this document. The draft document notice of availability was extensively advertised via newsletters, email distribution lists, webpage postings (<http://www.nmenv.state.nm.us/>) and press releases to area newspapers.

References Cited

Forest Guardians and Southwest Environmental Center v. Carol Browner, Administrator, US EPA, Civil Action 96-0826 LH/LFG, 1997.

SWQB/NMED. 2001. Quality Assurance Project Plan. Rev No.6. March, 9.

SWQB/NMED. 2000. State of New Mexico Procedures for Assessing Standards Attainment for 303(d) List and 305(b) Report. October.

SWQB/NMED. 1999. Pollutant Source(s) Documentation Protocol. July 1999.

USDA-FS. 2001. Precipitation from the Beaverhead Work Station on the Gila National Forest.

USEPA. 1993. Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters. EPA-840-B-92-002. Washington, D.C.

USGS. 1994. Water Resources Data New Mexico Water Year 1993. Data Report NM-93-1. Albuquerque, NM.

Appendices

Appendix A: Conversion Factor Derivation for Canyon Creek

Appendix B: Stream Geomorphology Information and Discharge Calculator for Canyon Creek

Appendix C: Relationship Between Turbidity and Total Suspended Solids for Canyon Creek

Appendix D: Data used for TMDL Field Measurement Calculations in Table 2 for Canyon Creek

Appendix E: Pollutant Source(s) Documentation Protocol for Canyon Creek

Appendix F: Public Participation Process Flowchart for Canyon Creek

Appendix G: Response to Comments for Canyon Creek

Appendix A: Conversion Factor Derivation for Canyon Creek

8.34 Conversion Factor Derivation

Million gallons/day x Milligrams/liter x 8.34 = pounds/day

10^6 gallons/day x 3.7854 liters/1-gallon x 10^{-3} gram/liter x 1 pound/454 grams = pounds/day

$10^6 (10^{-3}) (3.7854)/454 = 3785.4/454$

= 8.3379

= **8.34**

Appendix B: Stream Geomorphology Information and Discharge Calculator for Canyon Creek.*

section:									
Riffle									
stream: Canyon Creek					18-Jun-01				
location:									
description: F3 or B3c									
height of instrument (ft): 106.18									

notes	omit	distance (ft)	FS (ft)	elevation
LE of road	<input type="checkbox"/>	3	6.18	100
RE of road	<input type="checkbox"/>	15.5	6.45	99.73
	<input type="checkbox"/>	22.9	11.69	94.49
	<input type="checkbox"/>	24.4	11.89	94.29
LBF ?	<input type="checkbox"/>	25.9	11.96	94.22
	<input type="checkbox"/>	27.4	12.27	93.91
	<input type="checkbox"/>	28.5	12.23	93.95
	<input type="checkbox"/>	29.6	12.47	93.71
	<input type="checkbox"/>	31.2	12.61	93.57
LWE	<input type="checkbox"/>	34.7	12.8	93.38
	<input type="checkbox"/>	35.1	13.06	93.12
TW	<input type="checkbox"/>	36.3	13.28	92.9
	<input type="checkbox"/>	39.5	12.94	93.24
RWE	<input type="checkbox"/>	40.1	12.8	93.38
	<input type="checkbox"/>	41.5	12.56	93.62
	<input type="checkbox"/>	42.7	12.15	94.03
RBF ?	<input type="checkbox"/>	48.8	11.96	94.22
	<input type="checkbox"/>	50	12.08	94.1
	<input type="checkbox"/>	53.6	11.65	94.53
	<input type="checkbox"/>	58.1	10.16	96.02
	<input type="checkbox"/>	63.4	8.79	97.39
	<input type="checkbox"/>	67.3	7.48	98.7
	<input type="checkbox"/>	69.6	6.42	99.76
	<input type="checkbox"/>			
	<input type="checkbox"/>			

FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
11.96	6.45	35.1	1.5	0.091
94.22	99.73			

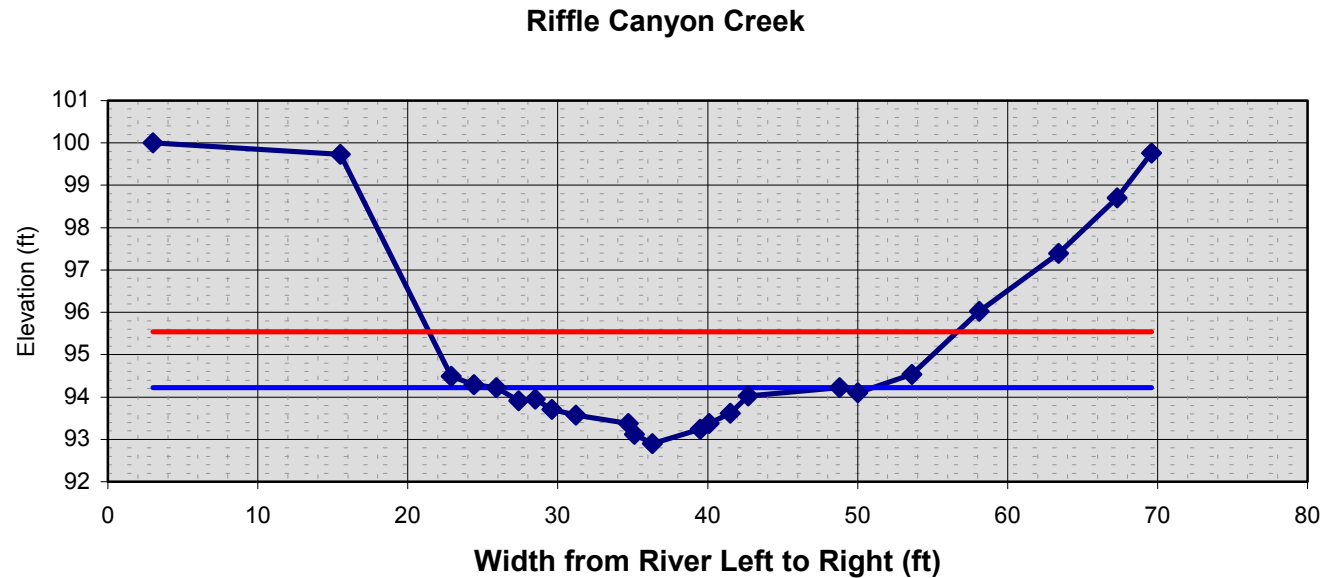
dimensions			
12.8	x-section area	0.5	d mean
25.1	width	25.4	wet P
1.3	d max	0.5	hyd radi
6.8	bank ht	49.3	w/d ratio
35.1	W flood prone area	1.4	ent ratio

hydraulics		
1.3	velocity (ft/sec)	
16.2	discharge rate, Q (cfs)	
0.47	shear stress ((lbs/ft sq)	
0.49	shear velocity (ft/sec)	
0.603	unit stream power (lbs/ft/sec)	
0.10	Froude number	
2.6	friction factor u/u*	
28.7	threshold grain size (mm)	

check from channel material			
172	measured D84 (mm)		
0.9	relative roughness	2.6	fric. factor
0.091	Manning's n from channel material		

Cross-Sectional Profile for Canyon Creek

The blue line represents the bankfull height and the red line shows the floodprone width.



Definitions:

THALWAG = the thread of the deepest water

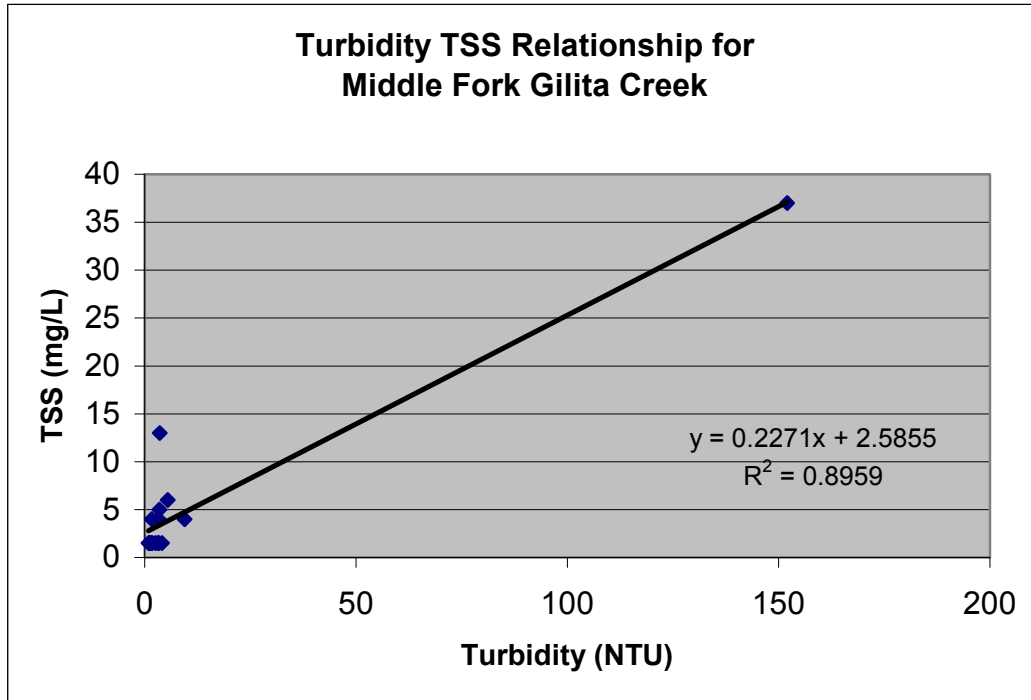
SINUOSITY = stream length/valley length or valley slope/channel slope

ENTRENCHMENT RATIO = the degree of vertical containment of a river channel (width of the flood prone area at an elevation twice the maximum bankfull depth/bankfull width)

W/D RATIO = the shape of the channel cross-section (ratio of bankfull width/mean bankfull depth)

SLOPE = slope of the water surface averaged for 20-30 channel widths

Appendix C: Relationship Between Turbidity Total Suspended Solids for Middle Fork Gilita (surrogate for Canyon Creek).



Appendix D: Data used for TMDL Field Measurement Calculations in Table 2 for Canyon Creek

Date	Time	NTU*	Date	Time	NTU*	Date	Time	NTU*
06/19/2001	2400	14.9	05/10/2001	2407	827.4	05/11/2001	2007	73.5
06/19/2001	2430	22.3	05/10/2001	107	712.4	05/11/2001	2107	56.6
06/19/2001	700	14.1	05/10/2001	207	531.1	05/11/2001	2207	42.8
06/19/2001	730	53.9	05/10/2001	307	801.4	05/11/2001	2307	32.8
06/19/2001	1330	18.3	05/10/2001	407	211.5	05/12/2001	2407	25.3
06/19/2001	1500	18.2	05/10/2001	507	135.7	05/12/2001	107	21.2
06/19/2001	1530	33	05/10/2001	607	26.9	05/12/2001	207	21.8
06/19/2001	1700	17.5	05/10/2001	707	20.7	05/12/2001	307	21.7
06/19/2001	2300	26	05/10/2001	807	178	05/12/2001	407	21.8
06/21/2001	2430	25	05/10/2001	907	281.3	05/12/2001	507	21.8
06/22/2001	2330	91.1	05/10/2001	1007	185.2	05/12/2001	607	21.7
06/23/2001	2430	43.9	05/10/2001	1107	197.3	05/12/2001	707	21.5
06/23/2001	100	37.1	05/10/2001	1207	519.6	05/12/2001	807	22.3
06/23/2001	130	82.9	05/10/2001	1307	15	05/12/2001	907	29.6
06/23/2001	200	28.2	05/10/2001	1407	20	05/12/2001	1007	22.8
05/08/2001	1807	19.4	05/10/2001	1507	23.5	05/12/2001	1107	27.1
05/08/2001	1907	17.4	05/10/2001	1607	40.8	05/12/2001	1207	28.9
05/08/2001	2007	15.3	05/10/2001	1707	44	05/12/2001	1307	48.7
05/08/2001	2107	13	05/10/2001	1807	44.9	05/12/2001	1407	20.7
05/08/2001	2207	12.3	05/10/2001	1907	38.8	05/12/2001	1507	24.6
05/08/2001	2307	12.5	05/10/2001	2007	30.2	05/12/2001	1607	22.8
05/09/2001	2407	13.2	05/10/2001	2107	22.9	05/12/2001	1707	21.8
05/09/2001	107	13.1	05/10/2001	2207	19	05/12/2001	1807	21.4
05/09/2001	207	13	05/10/2001	2307	17.9	05/12/2001	1907	22.6
05/09/2001	307	10.2	05/11/2001	2407	16.4	05/12/2001	2007	22.5
05/09/2001	407	10.2	05/11/2001	107	16.9	05/12/2001	2107	22.9
05/09/2001	507	11.5	05/11/2001	207	16.9	05/12/2001	2207	23.1
05/09/2001	607	11.1	05/11/2001	307	16.6	05/12/2001	2307	21.9
05/09/2001	707	10.8	05/11/2001	407	15.7	05/13/2001	2407	21.8
05/09/2001	807	10.7	05/11/2001	507	17.9	05/13/2001	107	21.9
05/09/2001	907	11	05/11/2001	607	17.9	05/13/2001	207	22.1
05/09/2001	1007	10.3	05/11/2001	707	17.5	05/13/2001	307	22.3
05/09/2001	1107	10.3	05/11/2001	807	17.2	05/13/2001	407	22.3
05/09/2001	1207	10.5	05/11/2001	907	17.2	05/13/2001	507	19.4
05/09/2001	1307	1000.5	05/11/2001	1007	17.5	05/13/2001	607	19.8
05/09/2001	1507	400.5	05/11/2001	1107	17.4	05/13/2001	707	20
05/09/2001	1607	152.9	05/11/2001	1207	17.6	05/13/2001	807	20.7
05/09/2001	1707	38.4	05/11/2001	1307	28.1	05/13/2001	907	20.2
05/09/2001	1807	404.9	05/11/2001	1407	35.5	05/13/2001	1007	20.5
05/09/2001	1907	12.3	05/11/2001	1507	38.4	05/13/2001	1107	24.5
05/09/2001	2007	740.1	05/11/2001	1607	111.6	05/13/2001	1207	24.4
05/09/2001	2107	726.1	05/11/2001	1707	105.2	05/13/2001	1307	32.8
05/09/2001	2207	746.3	05/11/2001	1807	90.5	05/13/2001	1407	106.3
05/09/2001	2307	756.4	05/11/2001	1907	82.3	05/13/2001	1507	35.3

Date	Time	NTU*	Date	Time	NTU*	Date	Time	NTU*
05/13/2001	1607	40.1	05/15/2001	1207	24	05/17/2001	807	10.9
05/13/2001	1707	44.6	05/15/2001	1307	28.2	05/17/2001	907	11
05/13/2001	1807	55.4	05/15/2001	1407	32.9	05/17/2001	1007	10.7
05/13/2001	1907	62.3	05/15/2001	1507	43.7	05/17/2001	1107	11.3
05/13/2001	2007	74.6	05/15/2001	1607	10.3	05/17/2001	1207	11.1
05/13/2001	2107	28.8	05/15/2001	1707	24.8	05/17/2001	1307	11
05/13/2001	2207	29.3	05/15/2001	1807	24.1	05/17/2001	1407	11.8
05/13/2001	2307	34.1	05/15/2001	1907	22.8	05/17/2001	1507	11.5
05/14/2001	2407	31.1	05/15/2001	2007	18.1	05/17/2001	1607	11.4
05/14/2001	107	33.3	05/15/2001	2107	10.1	05/17/2001	1707	12.3
05/14/2001	207	31.7	05/15/2001	2207	10.4	05/17/2001	1807	11.8
05/14/2001	307	34.2	05/15/2001	2307	10.1	05/17/2001	1907	11.8
05/14/2001	407	30.9	05/16/2001	2407	10.1	05/17/2001	2007	11.8
05/14/2001	507	23.6	05/16/2001	107	10.1	05/17/2001	2107	11.9
05/14/2001	607	22.8	05/16/2001	207	10.2	05/17/2001	2207	11.8
05/14/2001	707	22.8	05/16/2001	307	10.1	05/17/2001	2307	12
05/14/2001	807	23.1	05/16/2001	407	10.2	05/18/2001	2407	12
05/14/2001	907	22.8	05/16/2001	507	10.2	05/18/2001	107	12.3
05/14/2001	1007	22.9	05/16/2001	607	10.8	05/18/2001	207	12.1
05/14/2001	1107	23.8	05/16/2001	707	9.6	05/18/2001	307	12.3
05/14/2001	1207	31.5	05/16/2001	807	10.1	05/18/2001	407	12.2
05/14/2001	1307	32.9	05/16/2001	907	10.3	05/18/2001	507	12.3
05/14/2001	1407	27.2	05/16/2001	1007	10.3	05/18/2001	607	12.6
05/14/2001	1507	27.2	05/16/2001	1107	10.5	05/18/2001	707	13.3
05/14/2001	1607	25.5	05/16/2001	1207	10.3	05/18/2001	807	13.4
05/14/2001	1707	25.2	05/16/2001	1307	11.2	05/18/2001	907	13.5
05/14/2001	1807	25.3	05/16/2001	1407	16.1	05/18/2001	1007	13.2
05/14/2001	1907	23.2	05/16/2001	1507	22.2	05/18/2001	1107	13.8
05/14/2001	2007	23.1	05/16/2001	1607	18.4	05/18/2001	1207	16.5
05/14/2001	2107	22.9	05/16/2001	1707	18.1			
05/14/2001	2207	23	05/16/2001	1807	17			
05/14/2001	2307	22.9	05/16/2001	1907	15.7			
05/15/2001	2407	27.1	05/16/2001	2007	13.5			
05/15/2001	107	24.1	05/16/2001	2107	11.5			
05/15/2001	207	22.1	05/16/2001	2207	10.6			
05/15/2001	307	23.3	05/16/2001	2307	14.4			
05/15/2001	407	22.5	05/17/2001	2407	40.5			
05/15/2001	507	23	05/17/2001	107	22.2			
05/15/2001	607	23.1	05/17/2001	207	31.1			
05/15/2001	707	22	05/17/2001	307	26.2			
05/15/2001	807	23.5	05/17/2001	407	32			
05/15/2001	907	23.1	05/17/2001	507	22.5			
05/15/2001	1007	22.9	05/17/2001	607	11.6			
05/15/2001	1107	23.5	05/17/2001	707	11.2			

* **Denotes exceedance of the Turbidity Standard of 10 NTU.**

Appendix E: Pollutant Source(s) Documentation Protocol for Canyon Creek

POLLUTANT SOURCE(S) DOCUMENTATION PROTOCOL



**New Mexico Environment Department
Surface Water Quality Bureau
July 1999**

This protocol was designed to support federal regulations and guidance requiring states to document and include probable source(s) of pollutant(s) in their §303(d) Lists as well as the States §305(b) Report to Congress.

The following procedure should be used when sampling crews are in the field conducting water quality surveys or at any other time field staff are collecting data.

Pollutant Source Documentation Steps:

- 1). Obtain a copy of the most current §303(d) List.
- 2). Obtain copies of the **Field Sheet for Assessing Designated Uses and Nonpoint Sources of Pollution**.
- 3). Obtain digital camera that has time/date photo stamp on it from the Watershed Protection Section.
- 4). Obtain GPS unit and instructions from Neal Schaeffer.
- 5). Identify the reach(s) and probable source(s) of pollutant in the §303(d) List associated with the project that you will be working on.
- 6). Verify if current source(s) listed in the §303(d) List are accurate.
- 7). Check the appropriate box(s) on the field sheet for source(s) of nonsupport and estimate percent contribution of each source.
- 8). Photodocument probable source(s) of pollutant.
- 9). GPS the probable source site.
- 10). Give digital camera to Gary King for him to download and create a working photo file of the sites that were documented.
- 11). Give GPS unit to Neal Schaeffer for downloading and correction factors.
- 12). Enter the data off of the **Field Sheet for Assessing Designated Uses and Nonpoint Sources of Pollution** into the database.
- 13). Create a folder for the administrative files, insert field sheet and photodocumentation into the file.

This information will be used to update §303(d) Lists and the States §305(b) Report to Congress.

FIELD SHEET FOR ASSESSING DESIGNATED USES AND NONPOINT SOURCES OF POLLUTION

CODES FOR USES NOT FULLY SUPPORTED

<input type="checkbox"/>	HQCWF =	HIGH QUALITY COLDWATER FISHERY	<input type="checkbox"/>	DWS =	DOMESTIC WATER SUPPLY
<input type="checkbox"/>	CWF =	COLDWATER FISHERY	<input type="checkbox"/>	PC =	PRIMARY CONTACT
<input type="checkbox"/>	MCWF =	MARGINAL COLDWATER FISHERY	<input type="checkbox"/>	IRR =	IRRIGATION
<input type="checkbox"/>	WWF =	WARMWATER FISHERY	<input type="checkbox"/>	LW =	LIVESTOCK WATERING
<input type="checkbox"/>	LWWF =	LIMITED WARMWATER FISHERY	<input type="checkbox"/>	WH =	WILDLIFE HABITAT

Fish culture, secondary contact and municipal and industrial water supply and storage are also designated in particular stream reaches where these uses are actually being realized. However, no numeric standards apply uniquely to these uses.

REACH NAME:

SEGMENT NUMBER:

BASIN:

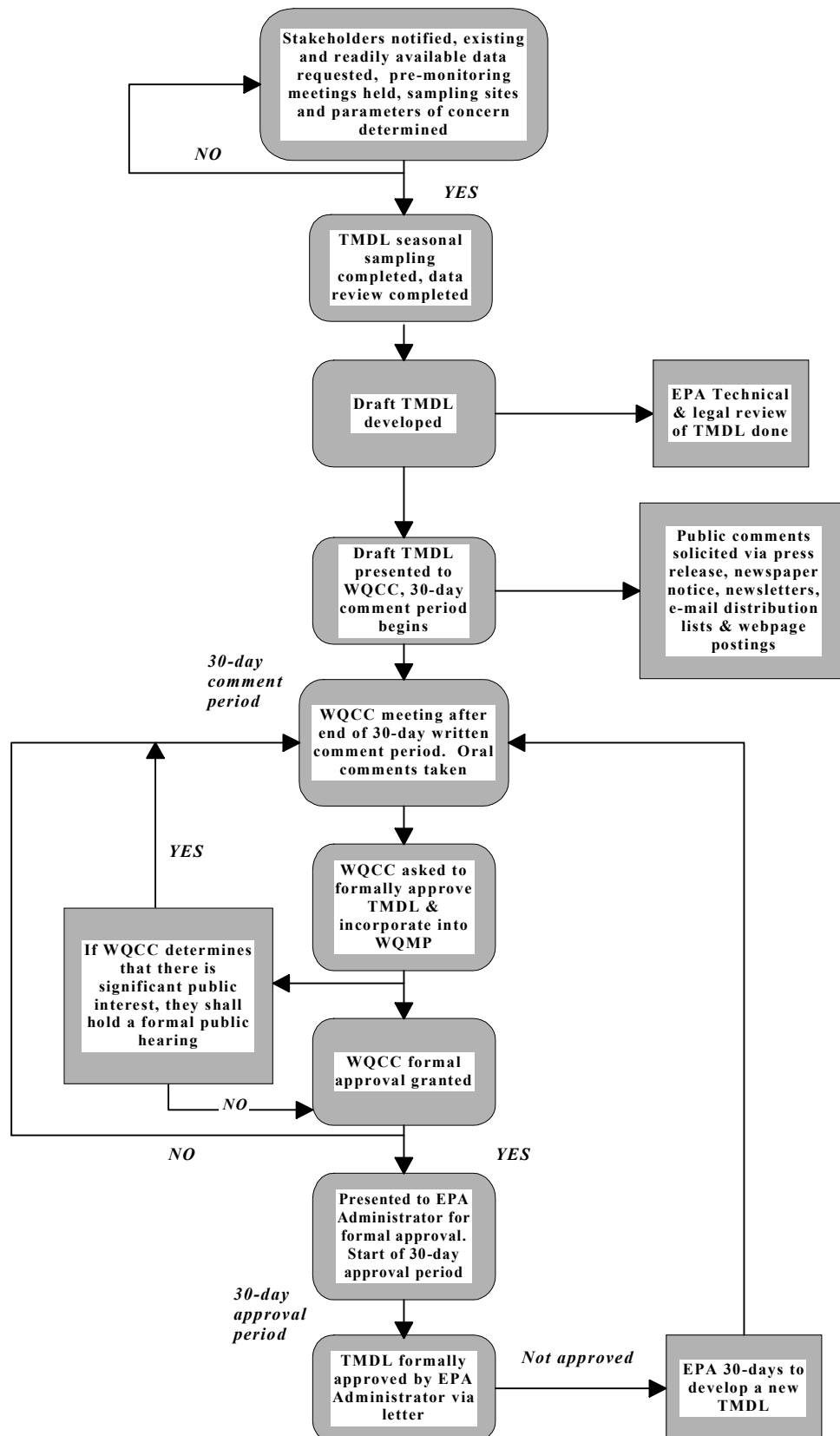
PARAMETER:

STAFF MAKING ASSESSMENT:
DATE:

CODES FOR SOURCES OF NONSUPPORT (CHECK ALL THAT APPLY)

<input type="checkbox"/>	0100	INDUSTRIAL POINT SOURCES	<input type="checkbox"/>	4000	URBAN RUNOFF/STORM SEWERS	<input type="checkbox"/>	7400	FLOW REGULATION/MODIFICATION
<input type="checkbox"/>	0200	MUNICIPAL POINT SOURCES	<input type="checkbox"/>	5000	RESOURCES EXTRACTION	<input type="checkbox"/>	7500	BRIDGE CONSTRUCTION
<input type="checkbox"/>	0201	DOMESTIC POINT SOURCES	<input type="checkbox"/>	5100	SURFACE MINING	<input type="checkbox"/>	7600	REMOVAL OF RIPARIAN VEGETATION
						<input type="checkbox"/>	7700	STREAMBANK MODIFICATION OR DESTABILIZATION
						<input type="checkbox"/>	7800	DRAINING/FILLING OF WETLANDS
<input type="checkbox"/>	0400	COMBINED SEWER OVERFLOWS	<input type="checkbox"/>	5200	SUBSURFACE MINING	<input type="checkbox"/>	8000	OTHER
<input type="checkbox"/>	1000	AGRICULTURE	<input type="checkbox"/>	5300	PLACER MINING	<input type="checkbox"/>	8010	VECTOR CONTROL ACTIVITIES
<input type="checkbox"/>	1100	NONIRRIGATED CROP PRODUCTION	<input type="checkbox"/>	5400	DREDGE MINING	<input type="checkbox"/>	8100	ATMOSPHERIC DEPOSITION
<input type="checkbox"/>	1200	IRRIGATED CROP PRODUCTION	<input type="checkbox"/>	5500	PETROLEUM ACTIVITIES	<input type="checkbox"/>	8200	WASTE STORAGE/STORAGE TANK LEAKS
<input type="checkbox"/>	1201	IRRIGATED RETURN FLOWS	<input type="checkbox"/>	5501	PIPELINES	<input type="checkbox"/>	8300	ROAD MAINTENANCE or RUNOFF
<input type="checkbox"/>	1300	SPECIALTY CROP PRODUCTION (e.g., truck farming and orchards)	<input type="checkbox"/>	5600	MILL TAILINGS	<input type="checkbox"/>	8400	SPILLS
			<input type="checkbox"/>	5700	MINE TAILINGS	<input type="checkbox"/>	8500	IN-PLACE CONTAMINANTS
			<input type="checkbox"/>	5800	ROAD CONSTRUCTION/MAINTENANCE	<input type="checkbox"/>	8600	NATURAL
			<input type="checkbox"/>	5900	SPILLS	<input type="checkbox"/>	8700	RECREATIONAL ACTIVITIES
<input type="checkbox"/>	1400	PASTURELAND				<input type="checkbox"/>	8701	ROAD/PARKING LOT RUNOFF
<input type="checkbox"/>	1500	RANGELAND	<input type="checkbox"/>	6000	LAND DISPOSAL	<input type="checkbox"/>	8702	OFF-ROAD VEHICLES
<input type="checkbox"/>	1600	FEEDLOTS - ALL TYPES	<input type="checkbox"/>	6100	SLUDGE	<input type="checkbox"/>	8703	REFUSE DISPOSAL
<input type="checkbox"/>	1700	AQUACULTURE	<input type="checkbox"/>	6200	WASTEWATER	<input type="checkbox"/>	8704	WILDLIFE IMPACTS
<input type="checkbox"/>	1800	ANIMAL HOLDING/MANAGEMENT AREAS	<input type="checkbox"/>	6300	LANDFILLS	<input type="checkbox"/>	8705	SKI SLOPE RUNOFF
<input type="checkbox"/>	1900	MANURE LAGOONS	<input type="checkbox"/>	6400	INDUSTRIAL LAND TREATMENT	<input type="checkbox"/>	8800	UPSTREAM IMPOUNDMENT
			<input type="checkbox"/>	6500	ONSITE WASTEWATER SYSTEMS (septic tanks, etc.)	<input type="checkbox"/>	8900	SALT STORAGE SITES
<input type="checkbox"/>	2000	SILVICULTURE						
<input type="checkbox"/>	2100	HARVESTING, RESTORATION, RESIDUE MANAGEMENT	<input type="checkbox"/>	6600	HAZARDOUS WASTE			
<input type="checkbox"/>	2200	FOREST MANAGEMENT	<input type="checkbox"/>	6700	SEPTAGE DISPOSAL			
<input type="checkbox"/>	2300	ROAD CONSTRUCTION or MAINTENANCE	<input type="checkbox"/>	6800	UST LEAKS	<input type="checkbox"/>	9000	SOURCE UNKNOWN
<input type="checkbox"/>	3000	CONSTRUCTION	<input type="checkbox"/>	7000	HYDROMODIFICATION			
<input type="checkbox"/>	3100	HIGHWAY/ROAD/BRIDGE	<input type="checkbox"/>	7100	CHANNELIZATION			
<input type="checkbox"/>	3200	LAND DEVELOPMENT	<input type="checkbox"/>	7200	DREDGING			
<input type="checkbox"/>	3201	RESORT DEVELOPMENT	<input type="checkbox"/>	7300	DAM CONSTRUCTION/REPAIR			
<input type="checkbox"/>	3300	HYDROELECTRIC						

Appendix F: Public Participation Flow Chart for Canyon Creek



Appendix G: Response to Comments for Canyon Creek

Comments of TMDL's
Charles Souders
Forest Soil Scientist
Gila National Forest
November 2, 2001

1. Listed Best Management Practices for several TMDL's. In the Glenwood Meeting Howard Hutckisons said that some of the BMP's shown were more for an urban situation rather than a forest situation. I agree. I do think we should show BMP's for grazing, road management, timber (where applicable), and fire. I have a Soil and Water Conservation Practices Handbook that Chic Spann in the Regional Office did several years ago. This might be helpful to you to write more applicable BMP's.

NMED Response

Best Management Practices, or BMPs, are generally tabulated under five commonly used areas for classification. Generally applied agricultural land use headings are: Irrigated Croplands, Non-Irrigated Croplands, Grazing Lands, Animal Waste Management, and Riparian & Wetlands. The Forest Service Handbook (2509.11) and the Soil and Water Conservation Practice Handbook refer to applicable BMPs based on respective agencies' interpretation of a particular "cause". Each agency/group will designate a particular "BMP code" to address a specific "action" that is needed, in response to change in a particular "indicator". In many jurisdictions there exist legislation, policy, rules, regulations and other legal requirements, which take precedence over the referenced Best Management Practices. These must be followed where they exist. However, the SWQB does not imply a "cause" within a TMDL document, nor do they monitor indicator species to effect a "designated BMP" reference. The SWQB is specifically charged with monitoring changes in the water column. Implications of causes can be made only through probable or possible causes in the course of routine water column monitoring. The wide range of BMPs suggested is specifically tailored to suit the watershed, not address a certain "cause" associated with reach specific probable causes. Because SWQB does not monitor terrestrial activities, we cannot infer that a particular "cause" is occurring within the watershed. Changes within the water column imply that certain activities may be occurring. Since all sources of terrestrial inputs to the water column are not monitored, nor implied, the SWQB suggests a wide range of BMPs to address all possible causes of water column changes.

2. Mangus Creek TMDL

A. Cover page. Threatened and Endangered Species. It should say yes. The steam has Loach Minnow and Spikedace, both of which are T&E Species.

NMED Response

The Bureau agrees and the changes have been made.

B. Under Other BMP activities in the Watershed. The forest is doing NEPA on several grazing allotments in the watershed. This should improve grazing management and watershed conditions.

NMED Response

The NEPA process for grazing allotments is a terrestrial activity. Grazing management and watershed conditions are vaguely linked, with the common factor being a comprehensive approach to restoration. Off road vehicle control, non-use road closure, thinning to promote groundcover growth, and an increase in riparian buffer quality, would be an example of a comprehensive approach. It has been demonstrated that elimination of cattle grazing, or ceasing to plant row crops for extended periods, does not initiate a restoration process for the watershed. The SWQB suggests a wide range of BMPs to address conditions to restore the watershed, not to address an “identified cause” by another agency/group.

The burn planned in March and April, 2001 was not completed.

This is the Mangus WQ project (FY01-I), and was delayed due to a delay in funds being released. The project is currently in the inter-agency MOU and private landowner permission process.

2. Sapillo Creek (Turbidity and TOC) On page 2 and 6 of TOC the description of Background Information is not the same as Turbidity page 2 Background Information. I talked with Pete Stewart on this and Lake Roberts was drained and dredged in 1993. He thought that the lake was drained again 4 years ago, (not 6 years ago).

NMED Response

The TMDL information came from Steve at the Las Cruces Game and Fish Department (oversight agency). The dates are not well documented in either the FS or the Game and Fish, due to the incident surrounding the drain. There was an incident where the overflow valve was compromised and lake was accidentally drained.

4. Whitewater Creek cover page. The lower portion of the creek has Loach Minnow T&E Species.

NMED Response

The Bureau agrees and the changes have been made.

Some where in the document it should show that above Whitewater Campground is wilderness. No grazing occurs in the wilderness. Potential treatments in the watershed above the campground is limited.

NMED Response

The SWQB does not differentiate between sample locations on a designated segment. Study plans are generally adhered to, on an “availability of access” basis. Many monitored reaches of those identified segments have only one sample station. Due to the fact that the SWQB only monitors changes in the water column, and attributes probable or possible watershed causes to those changes in the water column, we cannot differentiate between “above and below” a particular sample station. The TMDL is written, and the study plans generated, to characterize a particular reach, of an identified segment, not to characterize a particular sample station. On some reaches, with very slow moving water, water is known to travel upstream due to wind action. The sampling and TMDL generation is, in essence, an averaging approach to characterize a very large segment or reach within a segment. As the number of sample stations gets larger, the water column data can take on more locational specific characteristics. Statistically, the number of stations that would be needed to positively characterize one particular station far exceeds the capabilities of SWQB.

SWQB does not monitor terrestrial activities, and it is assumed that the data collected, regardless of the numbers of stations on a particular segment, is characteristic of the entire water column, for that TMDL reach. The BMPs suggested are pertinent to watershed restoration activities that will promote long term water column quality improvement for the entire segment, not to address “causes” or “limitations” as identified by other agencies/groups.

New Mexico Environment Department
Surface Water Quality Bureau
PO Box 26110
Santa Fe, NM 87502

November 8, 2001

RE: Comments on Proposed TMDL for Turbidity on Canyon Creek

To Whom It May Concern;

The following constitute Forest Guardians' comments on the above-named TMDL. We welcome the opportunity to participate in the public decision-making process for an issue as important and crucial to water quality as TMDL development. We hope that our comments are taken into serious consideration as the TMDL moves toward final approval, and we encourage you to continue to keep us informed so that we may continue to be involved in this process.

I. Voluntary Best Management Practices (BMPs)

We contend that voluntary BMP's in the draft implementation plan comply with neither the letter nor the spirit of the Clean Water Act, and will not result in the eventual re-attainment of water quality standards as envisioned by the TMDL process. We therefore urge you to include mandatory BMPs in the final TMDLs in order to assure that water quality standards have a real chance to be attained. We base this comment on the following narrative.

A TMDL consists of a pollutant specific standard and a plan to meet that standard. The standard, or "target load" is the maximum amount of pollution that a river can take from all sources without violating water quality standards. Once this "target load" is established, the TMDL then mandates pollution reductions to the various sources of pollution in a watershed to meet that standard. Pollution reductions are achieved through "load allocations" which set the maximum amount of pollution each source can contribute. These load allocations are referred to as "wasteload allocations" or "WLAs" when applied to point sources and "load allocations" or "LAs" when applied to nonpoint sources. A TMDL, therefore, represents the "sum of the individual WLAs for point sources and LAs for nonpoint sources and natural background." 40 C.F.R. § 130.2(i).

At a minimum, each plan of implementation must include "reasonable assurances" that the WLAs or LAs will, in fact, be implemented and achieved. With respect to WLAs for point sources, such assurances are easily provided by demonstrating how the load allocations will be incorporated into the permit. 40 C.F.R. §130.7(a). In each permit, effluent limitations can be adjusted to ensure that the pollution reductions succeed. With respect to nonpoint sources, providing these assurances is more difficult because there are generally no permits to adjust. Rather, the TMDLs are implemented via BMPs which are incorporated into a state's water quality management plan as outlined in section 303(e) of the CWA. 33 U.S.C. § 1313(e); 40 C.F.R. § 130.7(a).

Once the "target load" and "load allocations" are established, the TMDL process gets underway. The next step is to transform the calculations in the TMDL into real, on-the-ground results--to implement the TMDL. As a last resort measure, Congress mandated that TMDLs succeed in improving water quality. TMDLs "shall be established at a level necessary to

implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge." 33 U.S.C. § 1313(d)(1)(C). EPA agrees, stating that "TMDLs shall be established at levels necessary to attain and maintain . . . water quality standards." 40 C.F.R. § 130.7(c)(1). Whether or not a TMDL will improve water quality is therefore the standard for State TMDLs. 33 U.S.C. § 1313(d)(2).

Before approving a TMDL, EPA must ensure that the load allocations will succeed in protecting and improving water quality. 33 U.S.C. §§ 1313(d)(1)(C), 1313(d)(2); 40C.F.R. 130.7©. If EPA decides to disapprove a TMDL, then it must "establish such loads for such waters as [it] determines necessary to implement the water quality standards". 33 U.S.C. § 1313(d)(2).

"Reasonable assurances" are a required element of a TMDL and/or plan to implement a TMDL. Congress' intent to require reasonable assurances that TMDLs will be implemented to improve water quality is clearly reflected in the plain language of section 303 of the CWA, the legislative history of section 303 of the CWA, and the very purpose of the CWA. This is a reasonable conclusion because it ensures that the goals of the CWA are met.

In drafting the language of section 303 of the CWA, Congress consciously used the word "shall." States "shall" prepare TMDLs, "shall" establish such TMDLs at level necessary to implement water quality standards, "shall" disapprove TMDLs that fail to implement water quality standards, and "shall" have a management plan which includes TMDLs and a provision for "adequate implementation." 33 U.S.C. §§ 1313(d)(1)(C), 1313(e)(1), 1313(e)(3)(C), (F).

However the burden will fall primarily on the polluters to ensure that the BMPs are actually implemented. In NMED's own words from other TMDLs, cooperation from the polluters "will be pivotal in implementation of this TMDL." See Cordova Creek TMDL, 1999. The key word in NMED's plan is "cooperation." The polluters in that TMDL, like here, have the option of doing nothing. They can choose not to get involved-not to undertake the expensive and time consuming burden of implementing the BMPs. There are absolutely no obligations or mandates in the plan requiring polluters to implement the necessary BMPs.

By allowing section 319's voluntary program to be the sole basis for implementing the TMDL, the State is ignoring the "reasonable assurance" requirement. Unlike section 319's voluntary, consensus based approach under the CWA, TMDLs must "implement applicable water quality standards." 33 U.S.C. § 1313(d)(1)(C).

Thus, unlike section 319 plans, TMDLs must provide assurances that pollution reductions will occur and that water quality will be improved. See 33 U.S.C. § 1313(d)(1)(C). The "purely voluntary" plan to implement the TMDL plainly fails to provide such assurances. As such, there clearly are no assurances that this TMDL will be implemented to improve water quality.

The evidence suggesting that "purely voluntary" plans generally do not work is overwhelming. The failure of sections 208 and 319 of the CWA, two voluntary programs to control nonpoint source pollution, provides a good illustration. Unlike the CWA's point source program, which includes mandatory effluent limitations outlined in federally issued permits, the nonpoint source programs of section 208 and 319 of the CWA are void of any meaningful

federal mandates. Both programs are "purely voluntary." They rely on voluntary state planning and implementation, technical assistance, and ineffective financial incentives, rather than mandatory controls, to abate nonpoint source pollution. See 33 U.S.C. §§ 1288(b)(2)(F), 1288(j), 1329(h). The result is predictable.

Today, while point source pollution is at a twenty year low, nonpoint source pollution is out of control. In EPA's own words, nonpoint source pollution remains the Nation's largest source of water quality problems. It's the main reason that approximately 40 percent of surveyed rivers, lakes, and estuaries are not clean enough to meet basic uses such as fishing or swimming. The current nonpoint source pollution problem can be attributed to one factor: State reliance on voluntary compliance.

Under the voluntary schemes of sections 208 and 319 of the CWA, states are opting not to implement nonpoint source controls. States are reluctant to require controls because, as one observer noted, "the expense to states, both in terms of money and the political costs of imposing burdensome regulations on powerful agricultural interests, is potentially significant." See Houck, *supra* footnote 10 at 527. Without a "meaningful federal mandate, the states, with a few . . . exceptions have not implemented polluted runoff programs of their own." *Id.*

Even though EPA is well-aware of this fact, the "protection" Agency is allowing states to use the voluntary, incentive-based program under section 319 of the CWA, without any upgrades, to implement TMDLs. Once again, the results are predictable. A 1998 study of 55 TMDLs approved by EPA, many with voluntary implementation plans, showed a "near-total avoidance of implementation measures." Oliver A. Houck TMDLs IV: The Final Frontier, 29 ELR 10469, 10481 (August, 1999). Today, EPA is aware of hundreds of "purely voluntary" TMDLs that are not being implemented.

Indeed, it was the "purely voluntary" nature of the 1965 Water Quality Act that led to the 1972 amendments and the birth of the TMDL program. See H.R. 11896 at 68, 69, 106, 107, 92nd Cong. (1972); S. Rep. No. 92-414, at 3675 (1972).

Similar congressional concerns over the futility of voluntary measures prompted the 1935 amendments to the Federal Power Act, 16 U.S.C. §§ 797-817, the 1977 and 1990 amendments to the Clean Air Act ("CAA"), 42 U.S.C. §§ 7401-7671q, and the 1990 amendments to the Coastal Zone Management Act, 16 U.S.C. §§ 1451 to 1465 ("CZMA").

As one court noted, the 1935 amendment to the Federal Power Act, "made licensing a mandatory requirement" for all new projects. *Cooley v. F.E.R.C.*, 843 F.2d 1464 (D.C. Cir. 1988) (citing S. Rep. No. 621, 74th Cong., 1st Sess. (1935) and *First Iowa Hydro-Electric Coop. v. FPC*, 328 U.S. 152 (1946)). The earlier, purely voluntary scheme "had proven inadequate for the development of a comprehensive system of water power regulation." *Id.*

In the 1977 amendments to the CAA, Congress again recognized the ineffectiveness of voluntary compliance. As the Sixth Circuit noted, "although some voluntary compliance and cooperation was achieved under the former version of the [CAA], Congress clearly found the

earlier provisions an inadequate answer to the problem of interstate air pollution. *Air Pollution Control Dist. of Jefferson County, Ky. v. U.S.E.P.A.*, 739 F.2d 1071,1091 (6th Cir.1984) (citing H. R. Rep. No. 294, 95th Cong., 1st Sess. 329). The new mandatory CAA provisions, "were intended to establish an effective mechanism for prevention, control, and abatement of interstate air pollution." *Id.* at 1091. In 1990, Congress amended the CAA once again, this time replacing a failing "discretionary" state permitting program with a mandatory federally enforceable permitting scheme. See 42 U.S.C. §§ 7661-7661d.

In addition, in 1990 Congress passed the "Coastal Zone Reauthorization Amendments of 1990" (CZARA), amending the 1972 CZMA, because the earlier program of providing federal grant money for "voluntary" state programs was failing to protect coastal resources from nonpoint source pollution. Under the new approach, participating states are now required to prepare and submit to EPA for approval, a program to protect coastal waters from nonpoint source pollution. 16 U.S.C. § 1455b(a)(1). Before any federal money is dispersed, each state program must, at a minimum, include "enforceable policies and mechanisms to implement" the program. 16 U.S.C. § 1455(d)(16). CZMA defines "enforceable policy" to mean "State policies which are legally binding through constitutional provisions, laws, regulations, land use plans, ordinances, or judicial or administrative decisions, by which a State exerts control over private and public land and water uses and natural resources." 16 U.S.C. § 1453(6a). The existence of an "enforceable policy" provides the requisite assurance that plans will, in fact, be implemented and pollution reductions achieved.

In amending all of these environmental statutes Congress repeatedly and consistently has recognized the futility of "purely voluntary" programs in achieving Congressional goals. Today, a number of states are following Congress' lead by recognizing the need for enforceable policies and abandoning the voluntary approach towards controlling nonpoint source pollution. In Idaho, for instance, the state's water pollution control law imposes an affirmative duty on nonpoint source polluters to implement BMPs in order to meet and implement water quality standards for all waters with TMDLs. See Idaho Code § 39-3618. Failure to implement BMPs in such waters, may result in a civil action from the state agency. See Idaho Code § 39-3622. The enforceable program is working. The TMDLs for Idaho's South Fork of the Salmon River provide a good illustration. These TMDLs, which include mandatory BMPs to minimize sediment inputs from forestry operations (e.g., slope stabilization projects, grass seeding) are succeeding in returning a highly valued Chinook salmon and steelhead population to the once polluted River.

In Maryland, the State's Department of the Environment has the authority to require enforceable permits for certain nonpoint source discharges. See Md. Code. Ann., Envir. § 9-323(b). In addition, all soil and sediment pollution is prohibited, except for agricultural activities conducted in accordance with soil conservation and water quality plans. See Md. Code. Ann., Envir. § 9-322. A violation of these provisions may result in corrective action orders, injunctions, civil penalties, and even criminal prosecution. See Md. Code. Ann., Envir. §§ 9-334, 9-335, 9-338, 9-342, 9-343. Other states such as California, Oregon, Georgia, Vermont, and Wisconsin have adopted similar, enforceable approaches towards remedying nonpoint source pollution problems.

As described above, there is an overwhelming amount of evidence suggesting that "purely voluntary" measures are generally ineffective and unreliable. As such, a purely voluntary plan of implementation clearly does not belong in the TMDL. As a last resort measure there must be "reasonable assurances" that all TMDLs will be implemented to improve water quality and, voluntary plans, by themselves, fail to provide such assurances. In fact, NMED even concedes in other TMDLs that even with implementation of numerous BMPs, the waterway at issue may not be able to meet water quality standards.

Therefore, this purely voluntary approach does not belong in this TMDL because, unlike other clean up programs under the CWA, a TMDL comes with a mandate—there must be "reasonable assurances" that the TMDL will be implemented and will improve water quality. We urge the State to adopt measures similar to the ones outlined above and adopted by other States that are effective. We also urge NMED to pressure the Water Quality Control Commission to "promulgate and publish regulations to prevent or abate water pollution in the state" as authorized by New Mexico's Water Quality Act. This authority is listed as an "Assurance" in the TMDL, and we feel is much more likely to reasonably assure that the TMDL actually leads to the attainment of WQS.

II. Impacts of Grazing

Very little, if any, of the discussion in the permit concerning sources of non-attainment includes a reference to grazing activities on the watershed and their devastating impact on water quality. To the contrary, grazing is primarily mentioned in the section entitled "Other BMP Activities in the Watershed".

This section refers to "...the Forest Service and private landowners *actively* manage grazing activities..." (emphasis added). The proposed TMDL is written in reliance on this statement—that the entities involved with grazing are actively managing their activities. Our experience with monitoring grazing allotments on Forest Service lands leads to the complete opposite conclusion: that the entities involved with grazing on Forest service lands are not actively managing their allotments, and are in fact not complying with their management plans, if they have a current one. This is not merely a theory of ours either, as we have filed several lawsuits on the recent past concerning this exact issue in an attempt to force the Forest Service and the allotment holders to comply with their management plans and protect natural resources, including riparian areas and their waterways.

By not addressing impacts of grazing in the TMDL and at the very least developing BMPs to account for the potentially devastating effects of grazing on water quality, we believe the proposed TMDL is deficient and will not effectively reach its goals. Unless *all* sources of non-point source pollution are addressed in a TMDL, the waterway will continue to be impaired and in need of scarce monetary and physical resources in order to restore it to its proper condition, and the Clean Water Act's goals will never be realized.

III. Impacts of Water Diversions and Their Maintenance

Again, there is very little to no mention of the impacts of water diversions on this waterway and how they may adversely impact water quality. Thus, there are no strategies which address this source of pollution and no mitigative measures; therefore we seriously doubt that if

this water is actually impacted by diversions, it will be able to improve and re-attain water quality standards as required by the Clean Water act.

IV. Impacts of Roads and Road Maintenance Activities

There is similarly very little discussion of roads and their potential or real impacts on the waterway and those effects are not addressed in the BMPs. Again, we question how NMED can seriously attempt to bring this water back into attainment of standards if *all* of the pollution sources are not properly accounted for.

V. Milestones and Measures of Success

In the TMDL, there are a number of “Milestones” and “Measures of Success” listed, presumably as a means of assessing whether the TMDL process is working towards the goal of restoration. Unfortunately, nowhere in these assessment protocols can we find a reference to aquatic species’ health and rerstoration of native species to their habitats listed as a measure of success or productivity towards goals. This is inexcusable when one considers the deleterious effects of pollutants on aquatic species, especially the harm caused by severe algal blooms like the ones found on this waterway. How can NMED be serious about restoration and de-listing if you do not consider progress in the health of the ecosystem, measured by aquatic species, when you are looking down the road to check to see if your TMDL is serving it’s purpose. We seriously doubt that any real progress will be made if aquatic species’ health is not given primary consideration.

Restoration, including stocking of native species is not under the jurisdiction of the SWQB. However, in the Milestones section of the TMDLs, the SWQB states that milestones will be re-evaluated, and this process will involve re-evaluating the TMDL for attainment of water quality standards. Although specific targets and allocations are identified in the TMDL, the ultimate success of the TMDL is not whether these targets and allocations are met, but whether the beneficial uses and water quality standards are achieved.

The SWQB utilizes the biological data assessment protocols in the most recent EPA-approved Quality Assurance Project Plan for Water Quality Management Programs (QAPP) to determine any level of biological impairment in streams around the state. These protocols are derived from the EPA-developed rapid assessment protocols for benthic macroinvertebrates and fisheries sampling and analyses.

Several of the SWQB protocols developed (i.e. stream bottom deposits and plant nutrients) involve directly measuring impacts to the aquatic community (including macroinvertebrates and fisheries) for specific pollutants in order to determine whether designated uses and standards are/not being met.

The Nutrient Assessment Protocol developed by the SWQB involves gathering existing data on aquatic communities for the reach being assessed. Often, if there is not current information on the aquatic community, the SWQB will conduct rapid bioassessment protocols for fish and/or macroinvertebrates to gather recent data. The findings are then included in the TMDL document under linkage of water quality and pollutant sources, and also in the reach specific assessment forms for each reach sampled in the State. Assessment

for aquatic life impairment is done for TMDL listed streams, and/or streams that is not currently listed as impaired as part of our overall watershed monitoring strategy.

VI. Conclusion

We feel that this TMDL, as written, will not lead to a re-attainment of water quality standards in a timely and efficient manner, if at all. Our biggest concern is with the implementation of voluntary BMPs, which we fear will result in non-implementation. History shows that voluntary BMPs and similar measures rarely result in on the ground implementation, and that mandatory measures are the correct steps to take if the State is serious about cleaning up New Mexico's imperiled waters. We also find that the lack of thorough analysis and resultant paucity of corrective measures to address the adverse impacts of water diversions, grazing, and roads on this water is not in line with the Clean Water Act's goals and objectives. Also, since there are no point sources located within this watershed, it should be relatively straightforward to focus on the non-point sources as a means of restoring the health of the water. This primarily means that grazing and its deleterious effects need to be better addressed through the TMDL process or we are sure that the water will never be restored.

NMED Response

For every TMDL written by the SWQB, the TMDL identifies all potential sources of impairment (as listed on the cover page of every TMDL). As well, there is a discussion of the linkage of water quality and pollutant sources in every TMDL. Sources of impairment are from the best professional judgment of SWQB staff conducting the sampling effort and TMDL development. The Pollutant Source Documentation Protocol is utilized in the field, and included in TMDLs to identify the probable source of the pollutant. This protocol involves photo documentation of potential sources for each stream reach, and can be found with the source identification field sheet in the TMDL document, and in our administrative files.

We hope that when the final TMDL is written, you will reconsider this draft and remedy the problems that we have outlined above. Nothing less than the future of New Mexico's imperiled waters is at stake, and this resource is too important to not re-evaluate this potentially high impact document. Thank you for your consideration, and please contact us if you have any questions or concerns with our comments.

Sincerely,

Scott C. Cameron
Clean Water Coordinator
Forest Guardians

NMED Response

Several comments were received from the Forest Guardians. The following are responses by the SWQB to the Forest Guardians comments on the draft TMDL.

The SWQB would like to thank the Forest Guardians for their comments on this TMDL document. Presently, there is no requirement under the federal Clean Water Act for reasonable assurances for implementation of nonpoint source TMDLs. As stated in existing guidance (Guidance for Water Quality-Based Decisions: The TMDL Process, EPA 440/4-91-001, April 1991) implementation of nonpoint source TMDLs is through voluntary programs, such as section 319 of the Clean Water Act. According to the proposed regulations for TMDLs (40CFR part 130.2[p]), site-specific or watershed-specific voluntary actions are mechanisms which may provide reasonable assurances for nonpoint sources. The SWQB has implemented TMDLs statewide through a strong Watershed Protection Program. This program will continue to provide for the implementation of nonpoint source TMDLs.

Pursuant to Section (e)1 of the Clean Water Act (CWA), the Surface Water Quality Bureau (SWQB) has established appropriate monitoring methods to evaluate the effectiveness of controls or Best Management (BMP) activities. In order to optimize the efficiency of this monitoring effort, the SWQB has adopted a rotating basin monitoring strategy. This strategy is based on a 5-7 year return interval, and provides improved coordination and monitoring of BMP effectiveness.

Implementation plans are included in every TMDL in New Mexico. As stated in the TMDL document, this is a general implementation plan for activities to be established in the watershed. The SWQB will further develop the details of the plan with the help and cooperation of the stakeholders and other interested parties in the watershed. Detailed watershed management plans that include specific best management practices (BMPs) should be developed by and for watershed stakeholders. In this watershed, public awareness and involvement will be crucial to the successful implementation of this plan and improved water quality. Staff from the SWQB will work with stakeholders to provide the guidance in developing the Watershed Restoration Action Strategy (WRAS). The WRAS is a written plan intended to provide a long-range vision for various activities and management of resources in a watershed. It includes opportunities for private landowners and public agencies to reduce and prevent impacts to water quality. This long-range strategy will become instrumental in coordination, reducing, and preventing further water quality impacts in the watershed. SWQB staff assists with technical assistance such as the selection and application of BMPs needed to meet WRAS goals.

The watershed management plans would include any specific BMPs for activities, such as grazing or road runoff and maintenance, that are identified as contributing to the water quality impairment. It is not the intention of the SWQB to provide an all inclusive watershed management plan in the TMDL documents. In order to obtain reasonable assurances for implementation in watersheds with multiple landowners including Federal, State, and private land, the SWQB has established Memoranda of Understanding (MOUs) with various Federal and State agencies. These MOUs provide for co-ordination and consistency in dealing with Nonpoint source issues.

Milestones are also used in the implementation plans in the TMDL documents to determine if BMPs are implemented and standards attained.

The SWQB does not regulate water quantity issues for the State of New Mexico. All inquiries related to water rights should be directed to the Office of the New Mexico State Engineer. The SWQB programs include a focus on upland source controls, not instream flow, in the form of BMPs to protect and improve water quality statewide.